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To: Mark 5 Development Group

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Subject: VSI Interface Board for the Mark 4 Formatter

In order to connect the samplers in a Mark 4 Formatter to a Mark 5B Recorder, a VSI Interface (VSI4) Board is being designed. It will replace the existing "Interface" board in the Mark 4 Formatter and provide VSI outputs for connection to any VSI-compliant recording system. The 64 outputs of the Mark 4 samplers will be connected to two VSI output connectors. The VSI Board will make it possible to record at data rates up to 2048 Mb/s using two VSI (Mark 5B) recorders connected to the two VSI output connectors. The samplers will always operate at 32 Ms/s.

In order to keep costs down, this board will implement a limited number of modes of operation. There will be 3 modes, selectable by a simple MAT interface, as follows:

Mode	Function
0	VLBA Mode – USB 1 to 8 and LSB 1 to 8
1	Geodetic Mode – USB 1 to 14 and LSB 1 and 8
2	TVG Mode – Test Vector Generator

The mapping of Mark 4 sampler outputs to VSI bit streams for modes 0 and 1 is shown in the table on page 2.

Mode 0 is identical to the Metsahovi VSIC converter board, which we recommend for interfacing VLBA Samplers to a Mark5B recorder, at data rates up to 1024 Mb/s.

Mode 1 can be used for geodetic observations at any data rate up to 1024 Mb/s.

In Mode 0, Video Converters 9-16 are connected to a second VSI output connector, for recording at 2048 Mb/s on 2 Mark 5B recorders. With only 14 Video Converters, the useful data rate is limited to 1792 Mb/s.

More modes, up to a total of 16, can be added at any time by simply re-programming a Xilinx chip, using a socketed (plug-in) EEPROM.

Note that the Mark 5B can select an arbitrary set of 1,2,4,8,16, or 32 input bit streams.

MARK 4 SAMPLER TO VSI BIT STREAM MAPPING					
MARK 4 SAMPLER OUTPUT	VSI OUTPUT #1		MARK 4 SAMPLER OUTPUT	VSI OUTPUT #1 GEODETIC	VSI OUTPUT #2 ALL MODES
	VLBA	GEODETIC			
1US	0	0	9US	20	0
1UM	1	1	9UM	21	1
2US	2	2	10US	22	2
2UM	3	3	10UM	23	3
3US	4	4	11US	24	4
3UM	5	5	11UM	25	5
4US	6	6	12US	26	6
4UM	7	7	12UM	27	7
5US	8	8	13US	28	8
5UM	9	9	13UM	29	9
6US	10	10	14US	30	10
6UM	11	11	14UM	31	11
7US	12	12	15US		12
7UM	13	13	15UM		13
8US	14	14	16US		14
8UM	15	15	16UM		15
1LS	16	16	9LS		16
1LM	17	17	9LM		17
2LS	18		10LS		18
2LM	19		10LM		19
3LS	20		11LS		20
3LM	21		11LM		21
4LS	22		12LS		22
4LM	23		12LM		23
5LS	24		13LS		24
5LM	25		13LM		25
6LS	26		14LS		26
6LM	27		14LM		27
7LS	28		15LS		28
7LM	29		15LM		29
8LS	30	18	16LS		30
8LM	31	19	16LM		31

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vsi4.xls

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